# NEiNastran *for Windows*

NEiNastran Modeler

Overview

The NEiNastran Modeler (FEMAP V9) is a Windows-native pre- and post-processor used by engineering organizations world wide to model various products, processes and systems. It has an optional new graphical user interface that provides streamlined, direct access to all the NEiNastran Modeler functionality. It provides a depth of functionality in geometry import, geometry creation, meshing, materials and properties, loads and boundary conditions, analysis types and visualization options. The NEiNastran Modeler is tightly integrated with NEiNastran and also provides integration to a wide range of industry-standard structural and thermal solvers such as MSC.Nastran, ABAQUS, MARC, ANSYS, LS-DYNA, TMG, SINDA, and TRASYS.

Capabilities:

Geometry import/export:
- CATIA import (CATIA v4.x or v5)
- IGES import (IGES standards 4.0 to 5.3)
- IGES export (Parasolid geometry can be exported to IGES format)
- VDA import (direct access to VDA v2.0)
- I-deas import (access to .idi files generated by I-deas v8 and v9)
- Pro/Engineer import (Pro/E v17 to 2000i2)
- Solid Edge v16 import (access to Parasolid geometry in solid and sheet metal part files)
- Unigraphics import (from Unigraphics v11 to v18 CAD models, and direct access to Parasolid geometry exported from all Unigraphics versions)
- ACIS v13 and Parasolid v16.1 import (each of these interfaces converts imported geometry to the other's solid modeling kernel format)
- Import DXF and IGES points, curves, trimmed surfaces and solids
- Import or export Stereolithography (.stl) data, ACIS (.sat) and Parasolid (.x_t) parts or assemblies
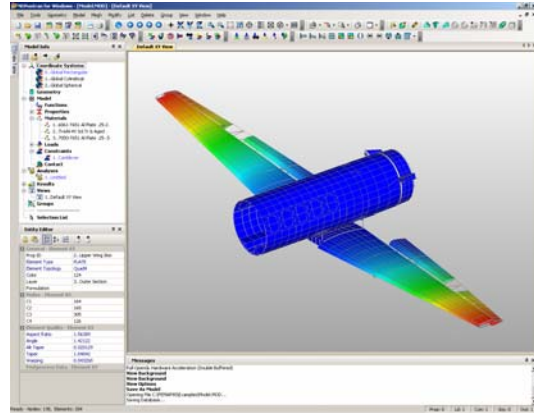

Geometry creation:
- Create point, line, circle, spline, surface, volume
- Boolean and extrude/revolve solid modeling
- Mid-surface extraction
- Project curves onto surfaces
- Intersect surfaces to create curves
- Define regions by projecting curves onto solids
- Create curves based on U-V space on surfaces
- Shell solids with constant thickness
- Rule, revolve, extrude and loft surfaces
- Stitch surfaces into solids
- Break, trim, split, extend, join and fillet, offset and copy geometric entities
- Automatically adjust geometry scale factor option

Meshing:
- Subdivision and semi-automatic meshing of solids
- Automatic and mapped meshing (with quads or bricks), including biasing
- Free surface meshing (quads or triangles only)
- Tetrahedral and hexahedral meshing
- Extrude and revolve curves into shell elements and shells into solid elements
- Mesh refinement and smoothing
- Interactive mesh editing

- Full associativity between geometry and mesh
- Auto Boundary Small Surface option – automatic grouping and removal of sliver surfaces
- Alternate method for calculating property values for a beam cross-section
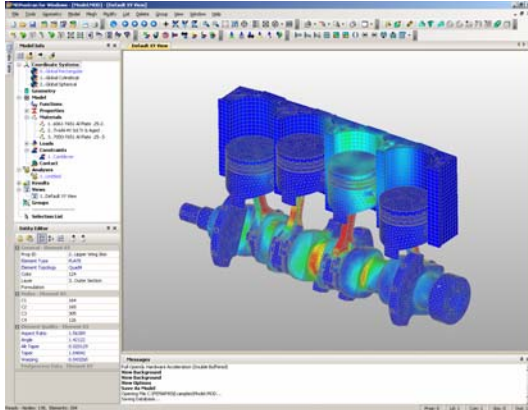
Element library:
- 1D (rod, tube, bar, tapered beam, pipe)
- 2D (quadrilateral and triangular plates - 6DOF/Node, membrane, shells, shear panels, laminates)
- 3D (solids four, five, and six-sided up to 20 nodes)
- Plane stress, plane strain
- Spring, mass and damper
- Coupled spring and damper
- Cable element:
  - Initial slack or tension
  - Failure (snap)
- Contact elements:
  - Gap element with friction
  - Slide line element with friction
  - Surface-to-surface contact with friction
- Weld option for contact surfaces
- Spot weld (WELD)
- Rigid general form, rigid rod, rigid bar, and rigid plate
- Interpolation
- Conduction
- Capacitance
- Boundary surface

Materials:
- Isotropic
- Orthotropic

- Anisotropic
- Hyperelastic
- Temperature and strain rate dependence
- Stress-dependent
- Creep
- User extensible library with thousands of material properties included
- Nonlinear elastic, bi-linear and plastic

Loads and constraints:
- Geometry or finite elements based
- Nodal forces and moments
- Pressure loads
- Gravity and centrifugal
- Rotational acceleration and velocity
- Single and multipoint constraints
- Symmetric, antisymmetric, axisymmetric boundary conditions
- Multiple loading and boundary condition subcases
- Thermal loading and stress recovery
- Temperature dependent conductivity
- Isotropic and anisotropic thermal conductivity
- Temperature dependant internal heat generation
- Temperature dependent heat transfer coefficient
- Temperature gradient dependent heat transfer coefficient
- Radiation and convection loads
- Surface normal heat flux
- Nonlinear functional forms
- Initial starting temperatures for all transient analyses
- Inertial relief loading

Groups and layers:
- Easily subdivide your model for visualization or post-processing purposes
- Group by:
  - Coordinate Clipping
  - ID, Associativity, Material, Property and Type
- Automatically add new entities to active or user-specified group
- Automatic group creation based on properties, materials, and geometric constraints

Results processing:
- Deformations, animations, and vector displays

- Single and multi-load set animations
- Filled color contours and criteria displays
- Isosurface and cutting planes, with dynamic control
- Shear and bending moment diagrams
- Error estimates
- Results across composite laminates
- Extensive result sorting capabilities
- XY-Plots with multiple curves
- Text reports:
  - Standard
  - User-customized
- Interactive data query with mouse
- Freebody displays, including Grid Point Force Balance support for grouped entities
- Import/export in comma separated tables
- Internet publishing with VRML support
- Save animations with AVI support

Solution capabilities:
- Linear Static Analysis
- Inertial Relief
- Thermal Stress and Deflection Analysis
- Nonlinear Static Analysis:
  - Geometric nonlinear
  - Material nonlinear
  - Tension-only cables and shell elements with multiple loading conditions
  - Gap, slide line, and surface-to-surface contact with friction
- Linear and Nonlinear Buckling Analysis
- Natural Frequencies and Model Shapes
- Linear and Nonlinear Direct Transient Response Analysis with adaptive time stepping
- Direct Frequency Response
- Modal Transient and Frequency Response
- Modal Response and Shock Spectrum generation
- Dynamic Design Analysis Method DDAM
- Random Vibration
- Response Spectra Generation
- Complex Eigenvalue Analysis
- Enforced Motion
- Linear and Nonlinear Prestress
- Linear and Nonlinear Steady State Heat Transfer
- Linear and Nonlinear Transient Heat Transfer

Analysis Set Manager:
- Improved Speed to the Analysis Set Manager Preview command
- The command List-Model-Analysis can be written to a file
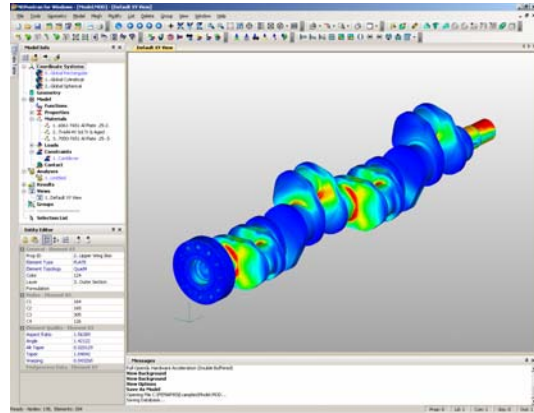
User interface:
- New Microsoft Office like Graphical User Interface (GUI)
- Customizable, floating dockable toolbars, along with 17 standard toolbars
- Multiple models in the same session
- Multiple views per model
- Cut and paste from one model to another
- Model Information Tree with direct access to higher level entities
- Entity Editor which enables direct review and editing of the model data
- Cut and paste data into other Windows applications with complete retention of the formatting
- Data Table that provides grid-based tabular representation of the model data
- Toolbar Entity Selector that allows entities to be selected from the top level of the user interface
- Full, multi-level undo/redo
- Online Help with hypertext links
- Dynamic highlight during selection operations
- Box, circle, polygon, front, depth and query picking of geometric and FEA entities
- Select entities by associativity

Graphics:

- Dual Windows GDI (Vector-Based) and OpenGL graphics
- 3D dynamic pan, zoom and rotation
- Hidden line and wireframe display
- Free edge and free face display
- Light source shading and transparency
- Complete beam and plate displays, including orientation, axes, offsets, etc.
- Dynamic highlight during selection operations

Customization:

- BASIC Scripting Language
- Neutral file: fully documented binary and ASCII file formats

Noran Engineering, Inc is aggressively focused on commitment to the customer. Detailed documentation, customized on-site training, and comprehensive technical support ensures that you will see immediate return on your investment.

For more information about our company or our products, please contact:

Headquarters:
Noran Engineering, Inc
5555 Garden Grove Blvd., Suite 300
Westminster, CA 92683-1886
USA
Phone: 1.714.899.1220
Fax: 1.714.899.1369
Email: info@noraneng.com
Website: www.NENastran.com

Europe:
SmartCAE
Piazza della Gualchierina, 9
59100 Prato
ITALY
Phone: +39.0.574.404.642
Fax: +39.0.574.401.265
E-mail: info@smartcae.com
Website: www.smartcae.com

Asia/Pacific:
Digital Solutions
Kyoei Nakasuji Bldg., 3-7-18
Nakasuji, Asaminami-ku
Hiroshima 731-0122
JAPAN
Phone: +81.8.2850.2210
Fax: +81.8.2850.2215
E-mail: post@digital-sol.co.jp
Website: www.digital-sol.co.jp

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From Noran Engineering, Inc.